



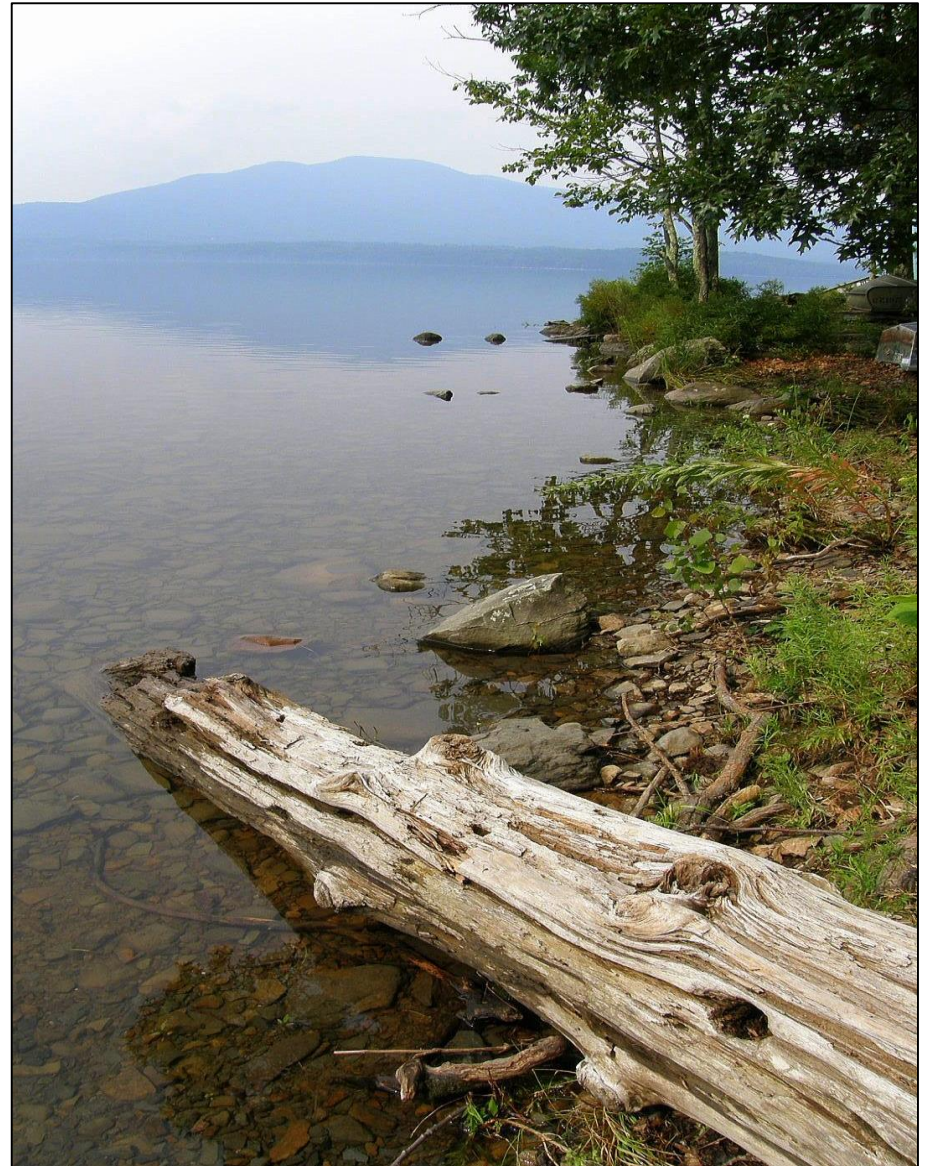
Climate Change and Managing for the Future

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Deputy Commissioner, Bureau of Water Supply

September 26, 2018

- Water supply overview
- Climate change efforts
- Delaware flow management
- Climate change concerns
- Salinity in Lower Delaware
- Alternative operations
- Managing for the future
- Next steps
- Questions

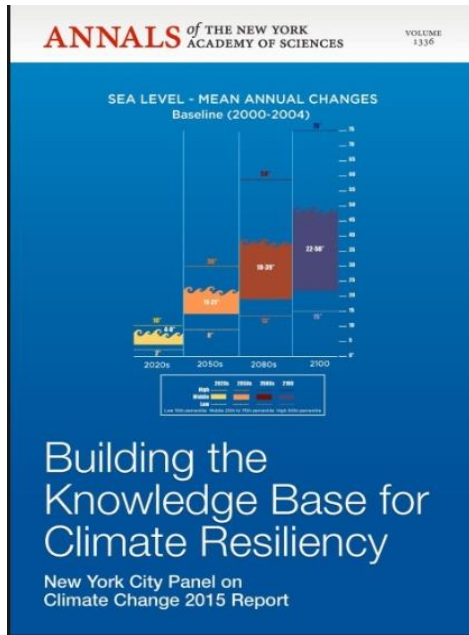


Water Supply System Overview

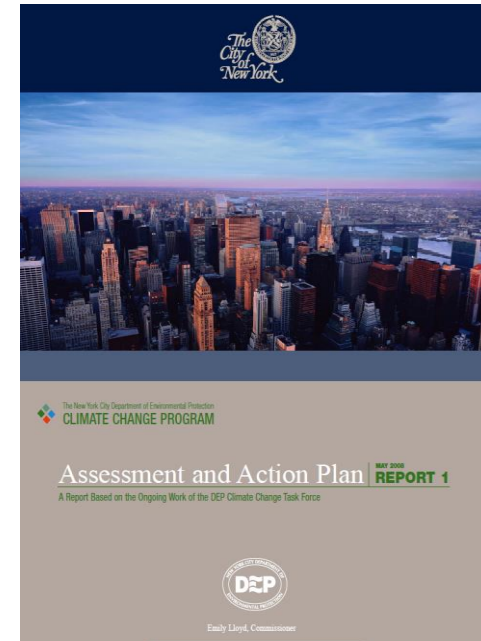


- Primarily a surface water supply
- 19 reservoirs & 3 controlled lakes
- System Capacity: 580 billion gallons
- Serves 9.5 million people (1/2 of population of New York State)
- Delivers approx. 1.1 billion gallons per day
- Source of water is a 2,000 square mile watershed in parts of 8 upstate counties

NYC

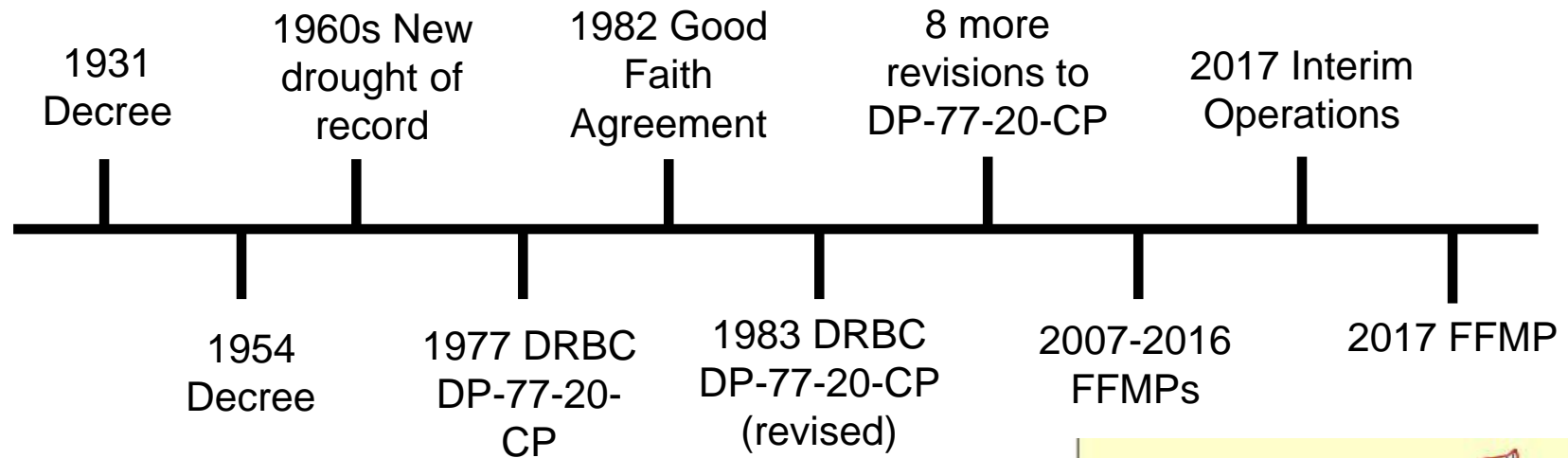


NYC DEP



- New York City Panel on Climate Change
 - Established by City law in 2012
 - Currently updating 2015 NPCC3 report
- Climate Resilience Design Guidelines
 - Citywide guidance on how every agency is incorporating climate change into project design
 - Next update April 2019
- Citywide Stormwater Resiliency Study
 - How extreme rain events and sea level rise will affect in-City drainage
 - To be completed by January 2019
- Wastewater Resiliency Program
 - Ongoing implementation of recommendations from NYC Wastewater Resiliency Plan
 - To be completed in 2021

Delaware Flow Management



- 2017 FFMP includes a phased approach to conduct comprehensive analyses to address Decree Party and Stakeholder concerns

- Includes:

- Thermal Bank for habitat protection
- Rapid Flow Change Bank
- Updated releases tables
- Salinity Study
- Other studies



NYC Delaware Climate Change Concerns

- The development of a new salinity strategy for the lower basin
- USACE F.E. Walter feasibility study
- Ensuring long-term water supply reliability and water resources management
- Getting the most out of existing infrastructure



F.E. Walter Reservoir

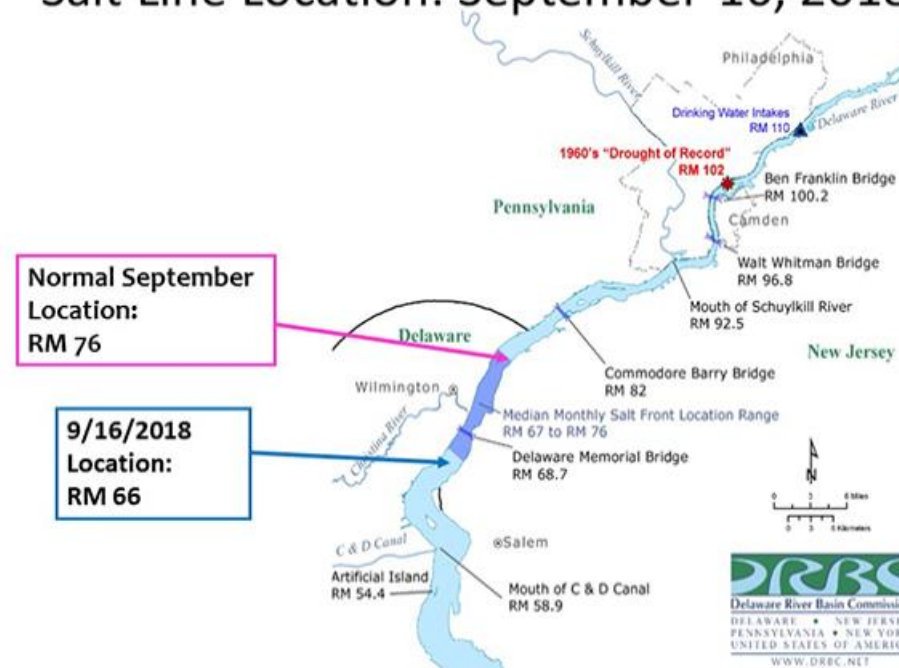


Delaware Estuary

Salinity in the Lower Delaware

- In the 2017 FFMP NYC is required to make releases based on the position of the salt front during drought emergency
- Water released with little benefit early in a drought is not available for either direct water supply or salinity repulsion in critical circumstances
- It is essential to ensure that all water released from storage provides substantial benefits
- A reliable salinity model is required to assess alternatives

Salt Line Location: September 16, 2018



Adjusting Trenton Flow Target

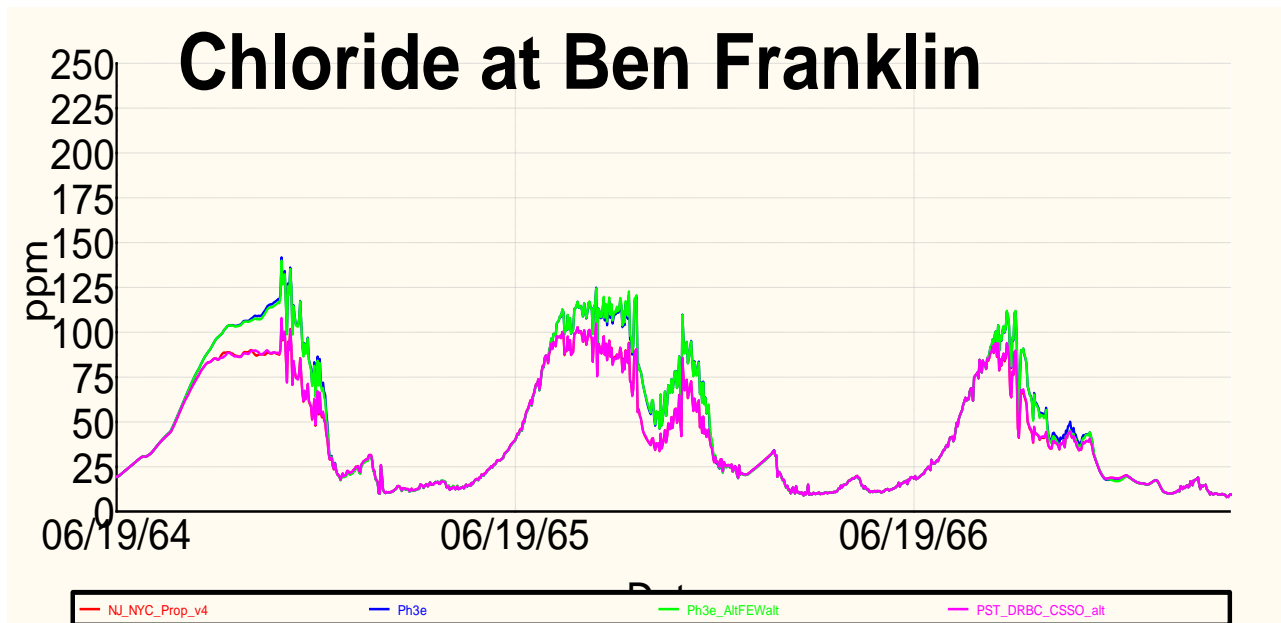
- Reducing Trenton target during normal and drought conditions
- To test the potential storage savings, the following changes were made to a proposed operations run:

Run Name	Normal	Watch	Warning	Emergency
Current Trenton	3000	2700	2700	2500
Alt 1	2700	2700	2700	2500
Alt 2	2700	2500	2500	2500
Alt 3	2700	2500	2500	Varying seasonal pattern from 2200 to 2500

Alt. Operations F.E. Walter Reservoir

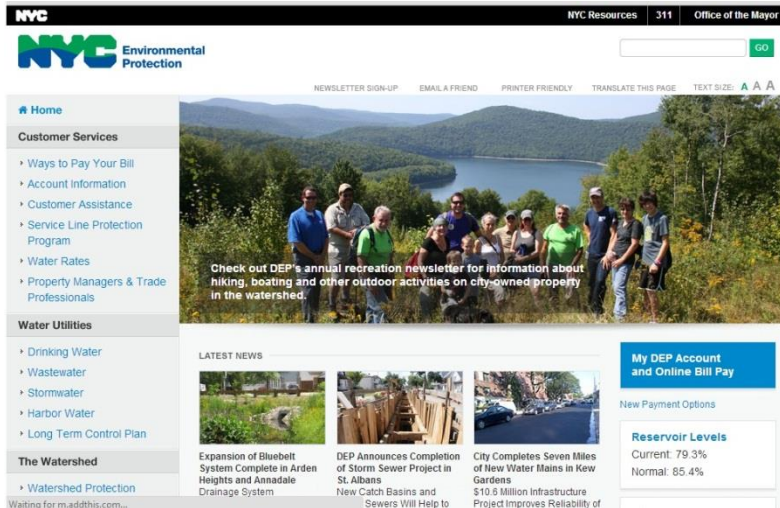
- Feasibility Study could provide additional storage
 - Appendix of Good Faith Agreement suggests up to 22.5 BG of storage for Trenton flow augmentation
 - Approximately 5 BG is a conservative estimate of additional storage
- Augment Trenton flow from F.E. Walter in all years, not just in drought emergency

- Work toward a new salinity strategy for the Delaware River
- NYC believes in creating management practices based on sound science
- Existing salinity models
 - NYC simple salinity model
 - DRBC's 1D and 2D models
 - DRBC/COE 3D model
 - PWD is developing its own hydrodynamic model



- Continue to work with the Decree Parties to establish a long term flow management plan for the Basin
- Continue to explore options to provide comparable protection in order to achieve detachment from the salt front
- Work collaboratively with Decree Parties, PWD and other stakeholder groups on salinity modeling and alternative operations
- Work with USACE to get the F.E. Walter Feasibility Study into their next work plan





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